SIRA WORKSHOP - NOTES FROM DATA HANDLING SUBGROUP – 14 May 2003

ASSUMPTIONS:

- SIRA downlinks 10-100 Gbytes/day of digitized RF.
- Considering only ground-based analyses.
- Prompt and equal access to data and analysis software

USER COMMUNITIES:

- **Solar Radio**
  comfortable with doing their own custom analyses using modified software and level-0 data
- **Solar Non-radio**
  interested in correlating with solar surface phenomena
  willing to use a GUI for custom analyses
- **Solar – Terrestrial**
  interested in correlating with S-T data;
  primarily wants convenient access to final, calibrated results
- **Space weather (ops)**
  Needs automated, prompt access to (or delivery of) standard products
  Speed and consistency more important than image quality
- **Magnetospheric**
  TBD
- **Astrophysics**
  Mission software to provide hooks and relevant quicklook,
  Specialized analyses tools not feasible within basic budget ?
- **Public**
  Needs easy access to interesting displays

DATA PRODUCTS – QUICK LOOK

- **Timescales**
  - Space weather (~1 hour)
  - Index for scientific analyses (~1 day)

- **Criteria**
  - No routine manual involvement in generation

- **Content**
  - Log
  - Event list
  - Dynamic spectra
  - Selected light curves
  - 1-D projected maps vs time
  - Movies (CLEANed)
  - State of health
  - All sky map (gradually integrated over quiet sun intervals)

DATA PRODUCTS – SCIENCE ANALYSIS

Digitized RF

Content equivalent to raw t/m, - organized by time
Accessible by users

Visibilities

Calculagted as a function of u,v,w,t,f and assumed phase center
Possible option: Calculate visibilities only over small BW (~kHz)
User software does frequency synthesis, with phase shifts depending on choice of phase center
Small BW of correlations prevents decorrelation
Provides a compact, convenient database for starting point for imaging tasks
Accessible to user in a variety of formats (FITS, CDF, etc)
with emphasis on interfacing to packages familiar to each user community

Standard movies

Generated by IDL (or ?) sw or by Myriad package
Fixed cadence, standard frequencies
Also generated for significant events
Higher quality / more complete than in quick look

CALIBRATION

- Baselines
  Internal from inter-spacecraft ranging ?
  Ground-based differential Doppler to monitor intertial orientation

- Phases
  Relative – finalized using closure phases
  Absolute
    – to place image on sky
    – TBD, but might explore use of Jupiter as a position reference if scattering is tractable

- Amplitude
  Relative - relative established by matching response to solar bursts
  - finalized using closure amplituds

  Absolute - rely on stable response
  - not so critical for coherent solar phenomena
  - possible use of occasional ground-generated radar signal

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IMAGING TASK

- 30000 images / day ➔ ~ 3 seconds per image,
  Comparable to what Nobeyama is doing currently
  Nobeyama images much larger and richer than SIRA's, but perhaps more straightforward to generate

- Image formation itself may not dominate the data handling task

- Data access, calibration, and low level manipulation may be more important in terms of elapsed time

- Might be worth exploring status/development of inherently 3-dimensional algorithm development

DATA ACCESS

- Diverse set of priorities
  - Convenience (eg GUI, Web-access)
  - Flexible (eg Command line in IDL)
  - Machine access (FITS, etc)

- Importance of VSO and HVSO connection

- Important to integrate access and display of key external data sets into SIRA analysis package